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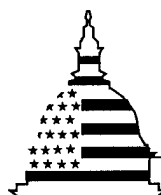
# WILDLIFE MANAGEMENT

## Negotiations on a Long-Term Plan for Managing Yellowstone Bison Still Ongoing



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Resources, Community, and  
Economic Development Division

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November 30, 1999

The Honorable Tom Campbell  
The Honorable Christopher Shays  
House of Representatives

Yellowstone National Park has the largest concentration of free-roaming bison in the lower 48 states. Throughout the winter and early spring, the bison periodically move back and forth across the park boundary seeking food that is not covered by hardened or deep snow. Because some Yellowstone bison have brucellosis—a disease that can cause cattle to abort during pregnancy—livestock owners and public officials in the bordering state of Montana fear that the bison will transmit the disease to domestic cattle. The federal government and states have been attempting to eradicate the disease in cattle nationwide for over 65 years. If two of Montana's cattle or commercial bison herds were found to have brucellosis, the state would lose its federal brucellosis-free certification, jeopardizing its right to freely transport cattle across state lines and creating potentially significant economic hardship for its livestock industry.

In July 1990, the Department of the Interior's National Park Service; the Montana Department of Fish, Wildlife and Parks; and the Department of Agriculture's Forest Service formed an interagency team to examine various alternatives for the long-term management of the Yellowstone bison herd. The purpose of the action was to develop a management plan that would ensure the viability of Yellowstone's wild and free-ranging bison herd while at the same time protecting Montana's domestic cattle from the risk of contracting brucellosis. Later, the interagency team was expanded to include the Montana Department of Livestock and Agriculture's Animal and Plant Health Inspection Service (APHIS). All of these agencies have some jurisdiction over the bison management effort. In June 1998, on behalf of the interagency team, the Park Service released a draft environmental impact statement (EIS) for public review and comment. The draft assessed the environmental impact of seven alternatives, including a preferred alternative, for managing the bison. The interagency team plans to issue a final EIS in late 2000. Afterwards, a final decision will be made on how the Yellowstone bison will be managed in the future.

Dissatisfied with the preferred alternative chosen from the seven alternatives analyzed by the interagency team in the draft EIS, various

nongovernmental organizations—including environmental groups, conservation groups, animal protection groups, Native American organizations, and a national animal health association—submitted five new plans for the interagency team to consider in its final decision-making process. These plans vary considerably in how they would manage the Yellowstone bison. Concerned about which plan was the most cost-effective, you asked us to identify (1) the key elements of the five nongovernmental plans and the government's preferred alternative and (2) the strengths and weaknesses of the economic analyses used to support each of these six plans. We are also providing you with information on the current status of the effort to issue the final EIS.

## Results in Brief

All the proposed plans for managing the Yellowstone bison have the same basic purpose. Specifically, they strive to maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission to protect the economic interest and viability of Montana's livestock industry. However, the specific objectives and management actions identified to achieve that purpose differ significantly among the plans. For example, although all the plans aim to maintain a wild, free-ranging herd of bison, two of the nongovernmental plans say that the herd should have no restrictions on where it goes and should be treated like any other wildlife outside the park. In contrast, other plans, including the government's preferred alternative, would allow the bison to range only within certain boundaries. Beyond these boundaries, the bison would be herded back into the park, captured, or killed. Furthermore, to protect Montana's cattle from the risk of contracting brucellosis, two of the nongovernmental plans would emphasize managing the cattle to keep them away from the bison. In contrast, the other plans, including the government's preferred alternative, would emphasize managing the bison within specific boundaries to keep them away from the cattle.

Of the six different bison management plans we reviewed, only the interagency team's draft EIS included an analysis of the net benefits (benefits minus costs) associated with its seven bison management alternatives. Benefits include such items as the existence of bison, opportunities for visitors to view bison, and the attraction of tourists to the park. Costs include such items as the cost of managing the bison. Consequently, we were unable to compare the potential economic effects of the various plans. Moreover, the scope of the interagency team's analysis of the benefits and costs is limited, and some of the data used in the analysis are subject to considerable uncertainty. For example, a

primary motivating factor for developing a long-term bison management plan is to avoid widespread economic hardship for Montana's livestock industry if brucellosis is transmitted from wild bison to cattle. However, the draft EIS does not estimate the economic effects of a potential outbreak. Without such information, the public and interagency final decisionmakers may have difficulty assessing whether the economic consequences of an outbreak justify incurring the costs of undertaking a particular management action. In addition, because of time constraints, the interagency team's contractor used data on other wildlife species to approximate the bison-related benefits. These estimates, however, are subject to considerable uncertainty, which substantially limits the usefulness of the estimated net benefits in assessing which management alternative would likely provide the greatest net benefits. The interagency team stated that it plans to improve the precision of the benefit estimates in the final EIS by using bison-specific data that are currently being collected.

Approximately 70 percent of the public comments received by the interagency team opposed the preferred alternative presented in the draft EIS. On the basis of the public comments and the findings of additional research completed after the draft statement's issuance, the interagency team is considering modifying the preferred alternative for the final EIS. On November 5, 1999, the federal lead agencies sent the latest proposal for modifying the preferred alternative to the state of Montana for its review. According to Department of the Interior staff, the proposal would rely on the vaccination of both cattle and bison, as well as their separation, to minimize the risk of brucellosis transmission. The proposal also recognizes the need for flexibility and allows for further modification of the bison management plan if future monitoring and/or research results indicate a need for change. As of November 10, 1999, negotiations among the members of the interagency team were ongoing.

## Background

The National Park Service manages bison only within the borders of Yellowstone National Park. Outside the park, neighboring states, such as Montana, manage wildlife not only on their own lands but also on other federal lands, such as those owned by the Forest Service. According to the National Park Service, as of August 17, 1999, there were 2,444 bison in Yellowstone National Park. Although millions of bison once ranged from the Appalachian Mountains through the Great Plains, Yellowstone is the only place in the lower 48 states where bison have existed since prehistoric times, although only 23 native bison remained in Yellowstone

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in 1902. For thousands of years, bison, nomadic by nature, have routinely migrated in and out of what is now the park to seek food. Such migration occurs especially in severe winters and early spring, when available forage is covered by hardened or deep snow.

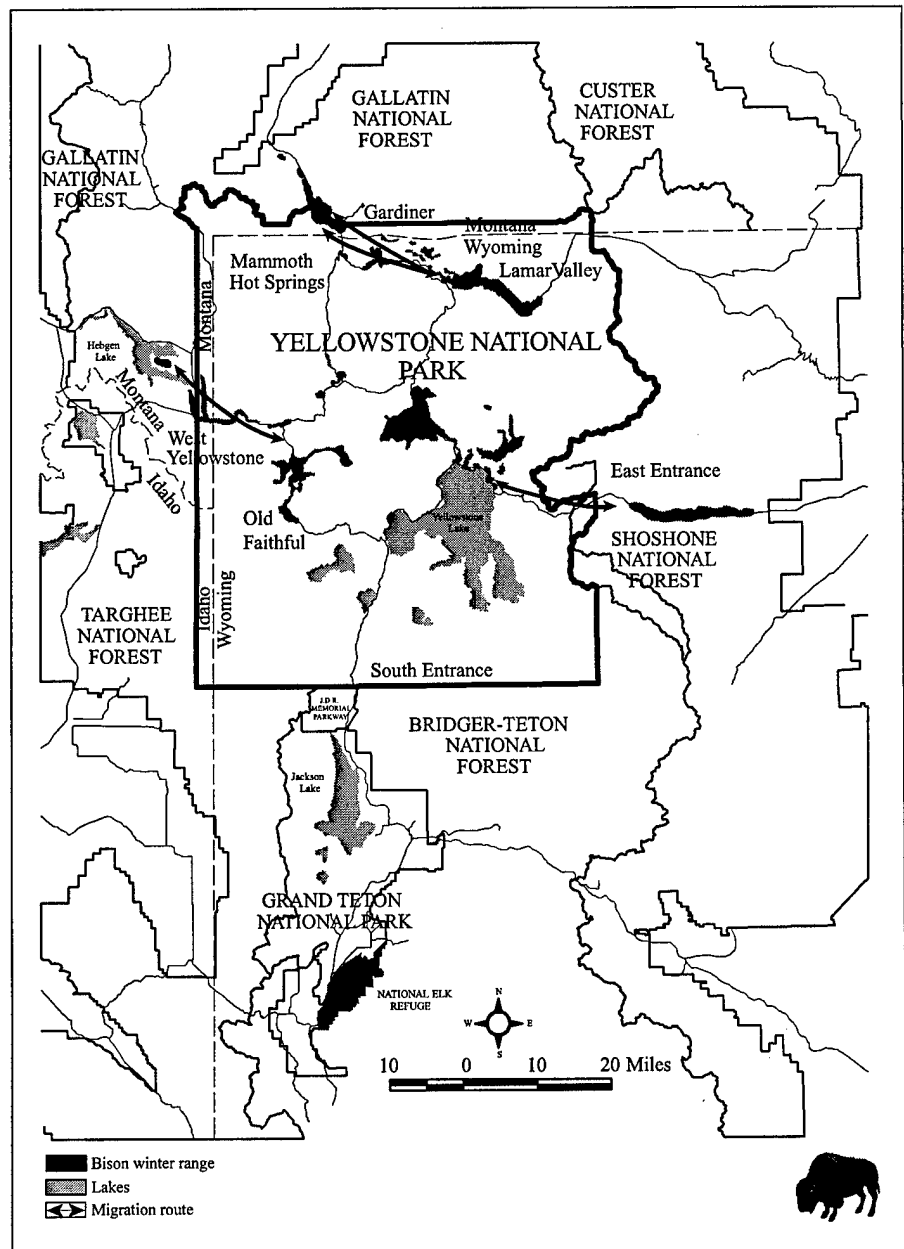
Bison migrate into Montana across the northern and western boundaries of the park.<sup>1</sup> In the north, when bison exit the park, they move onto adjacent national forestland or onto private land around the community of Gardiner, where several hundred cattle are present almost year-round. In the west, when bison leave the park, they move onto national forestland and private land around the community of West Yellowstone. Up to a few hundred cattle may occupy select public and private lands in the West Yellowstone area in the summer months, but no cattle are present in the winter. Depending on the time of year and the size of the cattle herds, over 2,000 cattle can occupy public and private land in the Montana portion of the Greater Yellowstone area.

According to the Park Service, it is important to note that only a portion of these 2,000 cattle actually occupy lands where bison are most likely to move. Specifically, on the north side of the park, approximately 300 cattle occupy private lands and about 80 cattle occupy public lands where bison are likely to move during the winter and early spring. On the west side of the park, approximately 350 cattle occupy lands where bison are likely to be found. However, these cattle are not grazed year-round and are not present when bison are actually in the area. As a result, only about 730 of the 2,000 cattle in the Greater Yellowstone area actually occupy lands that bison generally use when they leave the park. Montana officials noted, however, that if the Yellowstone bison were left uncontrolled, they would likely continue to migrate farther north along the Yellowstone River valley and northwest along the Madison River valley, to where more cattle are maintained year-round on extensive private lands. Figure 1 provides an overview of the Greater Yellowstone area and the routes that bison have generally taken when migrating out of the park.

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<sup>1</sup>Although some bison also migrate east into Wyoming, they are not covered by the draft EIS addressing bison migration into Montana.

**Figure 1: Winter Ranges and Migration Routes of the Yellowstone National Park Bison Herds**



Source: Spatial Analysis Center, Yellowstone National Park, National Park Service, 1997.

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Blood tests indicate that about half of the Yellowstone bison have been exposed to brucellosis. However, as the Park Service noted, recent research indicates that substantially fewer are actually infected with the disease. Because these bison, if uncontrolled, could interact with cattle either directly or indirectly, by sharing range where cattle will graze, they pose a risk of infecting cattle with brucellosis.

Brucellosis is a contagious bacterial disease that infects domestic animals, wildlife, and humans. In the Yellowstone area, elk and bison are the principal wildlife hosts for the disease. Transmission occurs primarily through the ingestion of infected milk or the products of birth or abortion. As a result, the risk of transmission is greater if cattle and bison interact during, or immediately after, the bison give birth. In cattle, the disease can cause abortions, infertility, reduced milk production, lameness, and swollen joints. In humans, brucellosis is known as undulant fever. Although rarely fatal, the disease can be debilitating. Symptoms include recurring fever, muscle and joint aches, headaches, and nausea. Today, there are very few cases of undulant fever in the United States. According to the Park Service, only three cases were reported in Montana during the past 10 years, and none was attributed to wild bison in the Greater Yellowstone area.

Because of the potential for brucellosis to be transmitted, APHIS and its state counterparts have a strong interest in the management of the Yellowstone bison. APHIS is responsible for eradicating brucellosis from cattle and commercial bison herds in the United States. Since a national brucellosis control program was first instituted in 1934, more than \$3.5 billion in federal, state, and industry funds has been spent trying to eradicate the disease from cattle across the nation. Because federal statutes on controlling the disease in livestock preempt the states' authority only when cattle and commercial bison are moving in interstate commerce, states have enacted their own statutes to supplement federal regulatory efforts and comply with national brucellosis eradication standards. According to APHIS, as of August 31, 1999, nationwide there were only five domestic cattle herds and one commercial bison herd affected by brucellosis. APHIS also reported that it had certified that Montana and 43 other states had no cattle or commercial bison that were infected with brucellosis, as of the same date. APHIS' brucellosis-free certification is required to export cattle to markets outside the state without incurring the expense of additional brucellosis testing.

The consequences of cattle being infected with brucellosis could be significant under the requirements of APHIS' eradication program. In a state that has been certified as brucellosis free, if a single herd of cattle or commercial bison becomes infected, the infected animals must be slaughtered, the herd quarantined, and the herds in the surrounding area tested to ensure that the disease does not spread. This action could have significant economic consequences to individual livestock operators. However, if no additional infection is found, the state can remain certified as brucellosis free. If an additional herd is found to be infected with brucellosis, the state's classification will be lowered and additional interstate testing requirements will be imposed across the state. This action could have significant economic consequences to the state's livestock industry.

A state with infected cattle or bison may also be subject to restrictions imposed by other states. For example, because of the increased movement of brucellosis-infected and -exposed bison out of Yellowstone National Park, Oregon announced in March 1997 that it would protect the interests of its cattle industry by immediately requiring the testing of any cattle entering the state from Montana and Wyoming. However, this requirement was dropped before being implemented. Other states have imposed, or threatened to impose, similar restrictions, but the costs of such actions have not been determined. Currently, there are no restrictions on the interstate movement of Montana cattle.

#### Bison Management Controversy Ongoing for Years

For years, federal, state, and local government officials; private landowners; scientists; and researchers have disagreed on how to manage Yellowstone's free-ranging bison. Opinions differ over the appropriateness of or need for a management emphasis that would eliminate brucellosis in the bison; the environmental consequences of actions needed to eradicate the disease; and the consequences of not eradicating the disease. The need to develop a long-range plan for managing the Yellowstone bison was formally recognized in July 1990, when the Park Service, Montana, and the Forest Service filed a notice of intent in the Federal Register to prepare an EIS examining alternatives for such a plan. Later, APHIS was added as a participant. The first goal of this effort was to issue the EIS by December 1991. However, as negotiations continued on ways to better manage brucellosis in bison, many deadlines for completing the effort came and went.

In January 1995, Montana filed a complaint in federal district court contending that the conflicting bison management policies of the Park



Service and APHIS threatened Montana's brucellosis-free certification. At the time, the park allowed natural processes to control wildlife populations and opposed efforts to manage wildlife in a way that would conflict with natural regulation or restrict wild animals' free-roaming nature.<sup>2</sup> APHIS, however, committed to eradicating brucellosis in the United States, believed that wildlife should be tested and, if infected, slaughtered to prevent the disease from spreading further. To settle the lawsuit, Montana and the federal government agreed to develop interim bison management procedures and an EIS for the long-term management of bison. In August 1996, the Interim Bison Management Plan was implemented. Generally, the plan does not allow the Yellowstone bison to migrate into Montana except in designated areas. As a result, since the notice of intent to prepare an EIS was issued, over 2,300 bison have been destroyed after leaving the park, including a record 1,084 bison that were shot or captured and slaughtered in the particularly harsh winter of 1996-97.

#### Progress Finally Made Toward Completing Draft EIS

Between July 1990, when the EIS process started, and the spring of 1997, little progress was made toward completing a draft EIS that was acceptable to all the participants. The interagency team had developed several alternative plans for managing the bison, but because of conflicting missions and objectives, the agencies could not agree on any one as a preferred alternative. In March 1997, in an attempt to break this deadlock and meet a court deadline for issuing a long-term bison management plan, the Park Service committed staff from its Denver Service Center to facilitate the process. With this assistance, in June 1997, Montana, APHIS, the Forest Service, and the Park Service were able to negotiate a new seventh alternative as the preferred alternative for the draft EIS. Table 1 outlines the seven alternatives presented and analyzed in the draft EIS.

<sup>2</sup>Under the Park Service's natural regulation policy, the size of the bison herd was regulated by natural forces, such as climate, food supply, and predation.

**Table 1: Seven Alternatives Analyzed  
in the Draft EIS**

<b>Alternative's number and name</b>	<b>Theme</b>
1. No action	This alternative is a continuation of the 1996 Interim Bison Management Plan without more recent modifications. The interim plan relies on strictly enforcing boundaries to keep bison and cattle separate and has no provision for quarantining bison.
2. Minimal management	This alternative focuses on changes in cattle operations outside the park and on minimal, nonlethal methods to ensure separation and minimize the risk of disease transmission between bison and cattle.
3. Management with emphasis on public hunting	This alternative relies on hunting to regulate the number and distribution of bison outside the park and separation to preclude contact between bison and cattle.
4. Interim plan with limited public hunting and quarantine	This alternative is similar to the Interim Bison Management Plan, but it includes quarantine and hunting as additional bison management tools.
5. Aggressive brucellosis control within the park through capture, testing, and removal	This alternative would implement an aggressive 3-year capture and testing program for all bison in the park. Bison testing negative would be released in the park, and those testing positive would be shipped to slaughter.
6. Aggressive brucellosis control within the park through vaccination	This alternative is a variation of No. 5 because it, too, focuses on eliminating brucellosis from the bison herd. However, parkwide capture, testing, and slaughter would not begin until a safe and effective vaccine had been applied to the entire herd for a number of years.
7. Preferred alternative – manage for a specific bison population range	The preferred alternative departs from all other alternatives in that it would focus on the population of the bison herd, and specific management scenarios would be put in place as the herd approached the upper or lower end of a population range. Agencies' controls would decrease as the bison population approached the lower end. Additional measures to remove increasing numbers of bison would be implemented near the upper end.

Source: Draft EIS for the Interagency Bison Management Plan for the State of Montana and Yellowstone National Park, National Park Service, June 1998.

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In June 1998, the draft EIS was released for public review and comment. Written comments were accepted until November 1998. Public meetings were also held in the Greater Yellowstone area and in major cities throughout the United States. In addition, the executive summary for the draft and a public comment form were posted on the Internet at the Park Service's Web site. Subsequently, the interagency team had the content of the comments analyzed for the team to consider in preparing a final EIS. The final EIS is to be issued in late 2000, according to the latest estimate by the interagency team. Afterwards, on the basis of the findings, conclusions, and recommendations that will be made in the final EIS and other relevant information, agency decisionmakers will issue federal and state records of decision on how the Yellowstone bison will be managed in the future.

In commenting on the draft EIS, various nongovernmental organizations provided five new plans or options for the interagency team to consider before it issues a final EIS. The interagency team is currently evaluating these plans, and the Park Service noted that an analysis of the feasibility and legal implications of these plans has not yet been completed. Table 2 provides the names of the plans, their sponsors, and summaries of their proposed approaches to ensuring the survival of a viable herd of bison and protecting Montana's cattle from the risk of brucellosis transmission.

**Table 2: Bison Management Plans Proposed by Nongovernmental Organizations**

<b>Plan</b>	<b>Sponsor(s)</b>	<b>Summary of plan's overall management approach</b>
The Bison Alternative	The Fund for Animals, an animal protection advocacy group, and other organizations, including the Humane Society of the United States and the Earth Island Institute.	The plan would allow bison to roam freely and would regulate the size of the herd naturally. To minimize the possibility of disease transmission, it would alter cattle operations on private and public lands, require the vaccination of all cattle, and eliminate the use of snowmobiles in Yellowstone.
Plan B	Written and submitted by an independent wildlife biologist and endorsed by various environmental, political, taxpayer, and Native American organizations.	The plan aims to ensure a free-roaming herd whose size would be regulated like that of other wildlife. It would minimize the risk of brucellosis transmission by vaccinating bison and cattle, removing cattle from public lands used by bison, and requiring changes in cattle operations.
Alternative 8	The Fort Belknap Indian Community Tribal Government of Montana, representing the Assiniboine and Gros Ventre Tribes.	The plan wants bison to remain free ranging and retain their status as wildlife but would establish population limits. The plan would control disease by separating bison and cattle, giving highest priority to removing live bison through capture, testing, and quarantine.
Citizens' Plan	Organizations including the Greater Yellowstone Coalition, Defenders of Wildlife, the Intertribal Bison Cooperative, the National Parks and Conservation Association, the National Wildlife Federation, the Natural Resources Defense Council, and the Wilderness Society.	The plan would limit the size of the herd to the park's ecological carrying capacity and would allow bison outside the park only in special management areas. Disease transmission would be minimized through changes in cattle operations on public lands and the acquisition of land or easements. The herd's size would be regulated through public harvest or live removal to quarantine for later disposition to tribal or other public lands.
USAHA Plan	The U.S. Animal Health Association (USAHA), an organization of state animal health officials, producers, researchers, and others interested in animal disease prevention and control.	The plan would reduce the size of the herd from the present population and not allow bison outside the park. The plan would eradicate brucellosis from the Yellowstone bison by using the same management tools used on cattle: vaccination, quarantine, testing, and removal.

Source: GAO's analysis of the nongovernmental organizations' bison management plans.

## Key Elements of the Various Bison Management Plans Differ

The sponsors of the interagency team's preferred alternative and the nongovernmental organizations responsible for the five alternative plans each believe their plan will meet the overall purpose set out in the EIS—that is, to maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission to protect the economic interest and viability of Montana's livestock industry. Differences in how these plans define a free-ranging herd and how they deal with the risk of brucellosis transmission demonstrate how little agreement there is on these issues. Under most of the plans, the bison would be free to range only as far as a designated boundary. Under a few plans, however, the bison could roam as freely as any other wildlife, both inside and outside

### Interagency Team Established Purpose and Objectives of the EIS

the park. In addition, some nongovernmental sponsors believe that the risk of transmission from bison to cattle is so small that it can be managed by keeping the two species separate. In contrast, other sponsors believe the economic consequences of such transmission are so great that, however small the risk, bison and cattle must not only be kept separate but the bison must also be vaccinated, tested for the disease, and slaughtered if they test positive or quarantined for a time if they test negative. Appendix I compares each proposed management plan by key element.

The National Environmental Policy Act of 1969 (NEPA)<sup>3</sup> and its implementing regulations set forth the requirements for preparing an EIS. Among other things, the regulations require a statement to explain why the document is being developed. This statement is to include information on why the action is required and identifies the specific purpose, objectives, and constraints in taking the action.

In preparing the EIS, the interagency team said that the purpose of the proposed action was to maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission to protect the economic interest and viability of Montana's livestock industry. The team defined a "wild and free-ranging population" of bison as one that is not routinely handled by humans and can move without restrictions within specific geographic areas. Furthermore, the team agreed that the economic interest and viability of Montana's livestock industry is tied directly to maintaining the state's brucellosis-free certification from APHIS.

The interagency team then elaborated on the purpose statement, establishing nine specific objectives for use in determining the reasonableness of each alternative and in selecting a preferred alternative. These objectives are as follows:

- Address the size and distribution of the bison population; have specific commitments relating to the size of the bison herd.
- Clearly define a boundary beyond which bison will not be tolerated.
- Address the risk to public safety and the threat of damage to private property posed by bison.
- Commit to the eventual elimination of brucellosis in bison and other wildlife.
- Protect livestock from the risk of brucellosis transmission.

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<sup>3</sup>42 U.S.C. 4321 et seq.

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- Protect Montana from the risk of a reduction in its brucellosis-free certification.
  - At a minimum, maintain a viable population of wild bison in Yellowstone National Park, as defined in biological, genetic, and ecological terms.
  - Base each alternative on factual information, with the recognition that the scientific database is changing.
  - Recognize the need for coordination in managing the natural and cultural resource values that are the responsibility of signatory agencies.

The interagency team agreed that any alternative unable to meet one or more of these nine objectives to some degree would be regarded as unreasonable and eliminated from detailed consideration in preparing the draft EIS.

According to the interagency team, agreement on these specific objectives was needed to help resolve policy conflicts among the various agencies participating in the development of the EIS. For years, these conflicts had blocked progress toward completing the EIS. For example, the policies of the National Park Service direct that native populations of wildlife be managed by natural processes in a relatively undisturbed setting to the maximum extent possible. Therefore, inside the park, weather, winter snow depths, competition for forage, predation, and other environmental conditions would determine the size of the bison population. However, since the risk of transmission from bison outside the park conflicts with APHIS' policies on the eradication of brucellosis and Montana's concerns about the loss of its brucellosis-free certification, each new alternative developed includes measures to control the bison population and set boundaries beyond which bison will not be tolerated. Cooperation among the agencies is necessary because the bison migrate between jurisdictions with these very different management objectives—the park seeking to protect and preserve the bison through natural regulation and the state aiming to safeguard its brucellosis-free certification through zero tolerance for transmission of the disease to its cattle. The Park Service has other objectives, such as providing for the public's enjoyment of natural and cultural resources, that are also affected.

The specific objectives agreed to by the interagency team did, however, limit the range of alternatives considered in the draft EIS. For example, the draft EIS states that a segment of the public asked for an alternative that used no lethal controls and allowed the bison to exist with no restrictions on their distribution or on the size of their population. The interagency team eliminated this alternative from full-scale analysis because it would

Management Actions Needed to  
Implement Plans Vary  
Significantly

not meet the objectives of the plan. Interagency team members said that taking no action to manage the bison was not a feasible alternative because of public safety concerns, the risk of brucellosis transmission, and the possibility that bison would tend to repopulate the public and private land outside the park.

Although the purpose of all the plans is to maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission, the preferred alternative and the plans proposed by nongovernmental organizations would achieve this purpose in different ways. For example, most plans call for specific limits on the size of the bison herd, while one plan would let nature regulate the herd's size. Furthermore, to control the risk of brucellosis transmission, one plan would change only cattle operations, while the majority of the plans would require a combination of management actions that would affect both cattle and bison.

The interagency team's preferred alternative focuses on controlling the size of the bison herd to achieve the purposes of the EIS. Specifically, the plan establishes a range of 1,700 to 2,500 animals. As the size of the herd approached the top of the range, agency control measures would be implemented to remove bison if they left the park or designated special management areas. As the total population approached the low end of the range, such control measures would be decreased. Agency control measures include hunting and the capture, testing, slaughter, and quarantine of bison. Hunting would be kept at low levels and allowed only in one or more of the special management areas. Facilities to capture bison (capture facilities) would also be located just inside the park boundary or in the special management areas. All captured bison would be tested for brucellosis. Bison testing positive for the disease would be slaughtered. Bison testing negative would be quarantined to ensure that they would continue to test negative over a period of time. Eventually, bison clearing the quarantine process would be placed with disease-free herds outside the park. To further reduce the risk of brucellosis transmission, the preferred alternative would haze (use nonviolent means, such as noise, to encourage movement) bison from areas where they were not wanted and vaccinate bison at capture facilities when a safe and effective vaccine became available. According to APHIS, the development of a safe and effective vaccine and delivery system should be completed by the winter of 2003-04. Free-ranging bison would also be vaccinated when an effective delivery system became available. In addition, the preferred alternative would encourage the vaccination of all of Montana's cattle calves. While cattle vaccination is common in Montana, the state's

Department of Livestock does not currently require it. In the long term, the preferred alternative also proposes to complete the acquisition of additional winter range for the bison north of the park boundary in the Royal Teton Ranch. The majority of this acquisition has already been completed.

The Bison Alternative plan would focus on the natural regulation of the bison herd. To address the risk of brucellosis transmission, the plan proposes a change in cattle operations. With natural regulation, no limit would be imposed on the size of the bison population. Rather, forces such as climate, food supply, and predation would serve as controls. A key provision of the Bison Alternative is the elimination of snowmobile trails and the use of snowmobiles within the park. The plan's sponsors believe that the groomed snowmobile trails maintained in Yellowstone allow more bison to survive the winters and/or provide the bison with an easier pathway to migrate out of the park. The plan would not have any special management areas, capture facilities, quarantine operations, or vaccination of bison. It does raise the possibility of purchasing land or easements for additional bison range. To protect Montana's cattle industry, the Bison Alternative emphasizes risk management rather than the eradication of brucellosis and the active management of cattle rather than of bison. Management actions include requiring the vaccination and annual testing of all cattle and giving bison priority over cattle on public lands. The Bison Alternative proposes closing cattle grazing allotments<sup>4</sup> on public lands adjacent to Yellowstone, which bison are known to use in the winter. For cattle on private land, the Bison Alternative would offer ranchers three options, all to be paid for by public funds. First, if ranchers could eliminate their cattle-grazing operations, they would be offered fair market compensation for the value of their cattle herds annually for 5 years. Second, if ranchers were willing to modify the type of livestock grazed—by, for example, changing from cow-calf operations to operations with a lower risk of contracting brucellosis, such as steer or spayed heifer herds<sup>5</sup>—any losses resulting from the change would be reimbursed. Finally, if ranchers would agree to construct bison-proof fences around their cattle pastures, vaccinate all their cattle, and establish annual brucellosis testing for the cattle, their costs would be fully reimbursed.

<sup>4</sup>Grazing allotments are permits granted to ranchers by land management agencies, such as the U.S. Forest Service, that allow seasonal use of the public range by domestic livestock.

<sup>5</sup>Steers and spayed heifers are non-breeding cattle that would not transmit the disease if infected by bison. Cow-calf operations are breeding cattle that are capable of transmitting the disease through birthing events.



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The Bison Alternative prohibits hunting but would allow "humane" hazing to move bison from areas where they are unwelcome.

Plan B would manage bison like all other wildlife except that it would control the risk of brucellosis transmission by vaccinating all bison. Other than vaccination, no management actions would be used to regulate the bison population within the park. Outside the park, bison would be managed like all other wildlife in Montana. Specifically, the state would determine the land's carrying capacity and the bison population would be limited to that level through hunting. However, instead of the public, only Native American tribes would do the hunting, and they would hunt only outside the park. To manage the risk of brucellosis transmission, the plan emphasizes the vaccination of all bison and changes to cattle operations. While the plan does not call for the capture, testing, and slaughter or quarantine of bison, it would separate cattle and bison, vaccinate all cattle, remove cattle from public lands used by bison, and offer ranchers on private lands compensation for switching from cow-calf operations to lower-risk operations, such as steer-only herds. Plan B also calls for actions such as urging all states to respect the brucellosis classifications of the federal government and modifying Montana's zero-risk policy to a policy accepting scientifically and economically based levels of risk.

Fort Belknap's Alternative 8 aims to protect and preserve the bison as a wild, free-ranging species and reaffirm the trust relationship between the bison and Indian tribes. Bison would be allowed to use all public lands outside the park and would have priority over cattle. The size of the herd would be scientifically established on the basis of the land's carrying capacity. The plan also calls for acquiring additional land to provide winter range and migration routes for bison. Excess bison would be captured and tested for brucellosis. Bison testing positive would be held for tribal harvest. Bison testing negative would be placed in quarantine using the same protocol as the preferred alternative. The live removal, quarantine, and preservation of all bison that tested negative for brucellosis would be the alternative's highest priority. The quarantine facility would be located at Fort Belknap. The plan would also address the risk of brucellosis transmission by offering incentives to ranchers to change their livestock operations, giving bison priority in the use of public land by modifying grazing permits and requiring the vaccination of cattle at no expense to the ranchers.

The Citizens' Plan is most similar to the preferred alternative in the EIS. According to the plan's sponsors, the biggest difference is that there is no

testing and slaughtering of bison for disease control. Bison would be removed only to control populations. Limits on the size of the herd would be scientifically established for both the special management areas and the park. Inside the park, bison would not be shot or captured. The plan would manage bison using special management areas with flexible boundaries on public land outside the park on its north and west sides. Traditional public harvest (hunting) and capture facilities established outside the park on the north and west sides would be used to regulate excess numbers. To control disease, the plan focuses on eliminating the opportunity for transmission rather than eradicating the disease. Specifically, the plan would keep cattle and bison separate through changes to private cattle operations, including changes in the timing or location of cattle grazing on public land used by bison. The plan would also give bison priority in the use of public land outside the park. If separation could not be achieved, public grazing allotments would be eliminated. The plan encourages vaccinating cattle and all bison when a safe and effective vaccine and a nonintrusive delivery system are available. Hazing would be used to move bison endangering persons or private property, and compensation would be available to cover private property losses. In addition, a revised, more humane, quarantine protocol and facility would be used for bison testing negative for brucellosis. Bison clearing quarantine would be turned over to tribes or released on other public lands. The plan also calls for acquiring land or easements from willing sellers for key additional winter range north and west of the park. A unique element of the Citizens' Plan is the establishment of a long-term advisory team consisting of staff from involved agencies, tribes, and the public for consultation on bison management issues.

The focus of the U.S. Animal Health Association Plan, which modifies one of the draft EIS alternatives, is to eradicate brucellosis from wild bison. Basically, the plan, which the sponsors see as an extension of the national effort to eradicate brucellosis in cattle, proposes to use the same tools to eliminate the disease in bison as the national eradication program has used for cattle. These tools include capturing and testing animals and slaughtering those that test positive and quarantining those that test negative. In addition, the plan imposes strict controls on the movement of bison at the borders of the park to prevent brucellosis-exposed bison from leaving. The plan has two phases. Phase I would vaccinate all bison to reduce the number testing positive. Bison calves would be vaccinated immediately, and adults would be vaccinated with a reduced dose until a safe and effective vaccine became available. Phase II would capture and test every bison remaining within the park. Bison testing positive would be

slaughtered with the goal of eradicating the disease. The plan would reduce the size of the special management area on the north side and would have none on the west side. It would limit the population to a maximum of 1,800 bison within the park and the small special management area until a scientific evaluation of these areas' carrying capacity is done. Bison that left the park would be hazed back into the park or shot. A unique characteristic of this plan would be the number of activities taking place in the park, especially during phase II, including the plowing of more park roads for winter access to bison management facilities. The plan does not call for changes to cattle operations on public or private land, apart from some testing and vaccination of cattle. According to the sponsors, their plan is the only one that would eliminate the disease from bison and the only one that could be implemented without changes to existing federal or state laws, rules, or regulations.

## Economic Analyses of Bison Management Plans Are Limited

Of the six different bison management plans we reviewed, only the interagency team's draft EIS included an analysis of the net benefits (benefits minus costs) associated with its bison management alternatives. Consequently, we were unable to compare the potential economic effects of the various plans. Although the interagency team analyzed the benefits and costs, the scope of their analysis is limited, and some of the data used in the analysis are subject to considerable uncertainty. For example, although the draft EIS states that a primary motivating factor for the bison management plan is the potential for widespread economic consequences to Montana's livestock industry if brucellosis is transmitted from wild bison to cattle, the draft EIS does not estimate the economic effect of a potential outbreak. Without such information, the public and, ultimately, the final decisionmakers may have difficulty assessing whether the economic consequences of an outbreak justify the cost of undertaking a particular management action. In addition, because of time constraints, the interagency team's contractor used data on other wildlife species to approximate the bison-related benefits, such as the value the public assigns to the species' existence and the value visitors place on increased or decreased viewing opportunities. Although the draft EIS acknowledges that these estimates are subject to considerable uncertainty, the range of uncertainty is so wide as to substantially limit the usefulness of the results. Without more precise information, it is difficult to assess which alternative would likely provide the greatest net benefits. Members of the interagency team stated that they plan to improve the precision of the benefit estimates in the final EIS by using bison-specific data that are currently being collected.

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### Only Draft EIS Included an Economic Analysis

While the interagency team included an analysis of the net benefits associated with all seven alternatives analyzed in the draft EIS, the sponsors of the nongovernmental plans stated that they did not have the technical expertise or the resources needed to conduct benefit-cost analyses of their plans. According to one of these sponsors, the nongovernmental plans were created to provide the federal government with additional alternatives to consider in its analysis and final decision-making process. The nongovernmental plans did qualitatively describe some of the benefits and costs that would be realized upon implementation. However, without a measure of each plan's benefits and costs in comparable terms (for example, dollars), the net benefits of the plans cannot be compared.

Although none of the nongovernmental plans included a benefit-cost analysis, a consultant to the sponsors of Plan B assessed the cost-effectiveness of Plan B, the Citizens' Plan, and the interagency team's preferred alternative. Cost-effectiveness analysis is a technique for comparing the costs of achieving specified goals under alternative plans. On the basis of this analysis, the consultant reported that Plan B would accomplish the same purpose as the preferred alternative but at substantially less cost. The consultant's analysis is, however, of limited use because it is based on questionable assumptions. For example, under Plan B, the bison in Yellowstone National Park would be vaccinated. Even though a safe and effective vaccine for adult bison and a method for delivering the vaccine have not yet been developed, the consultant assumed that the risk of brucellosis transmission from wild, free-ranging bison to cattle is zero. However, members of the interagency team stated that the risk is not zero; that is, over time there is a chance that wild, free-ranging bison will infect cattle because, as the chances for interaction increase, so do the chances for transmission. In addition, APHIS noted that the current cattle vaccinations are only about 65 to 80 percent effective. The consultant's analysis does not account for the costs that cattle producers would incur under Plan B if wild, free-ranging bison transmitted brucellosis to cattle.

To estimate the benefits and costs of the alternatives proposed in the draft EIS, the interagency team used the Water Resources Council's principles for evaluating alternative plans for water and related land resources as guidance.<sup>6</sup> The guidance sets forth practices for assessing and assigning dollar values to both the beneficial and adverse effects of alternative plans

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<sup>6</sup>Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, U.S. Water Resources Council (Mar. 10, 1983), 137 pp.

on the national economy. We found that the economic analysis that was completed for the draft EIS generally follows the practices set forth in the guidance. For example, the guidance states that economic effects are to be measured in terms of the direct net benefits that accrue to the planning area and the rest of the nation. In addition, an evaluation of alternatives should be based on the conditions most likely to exist in the future with and without the plan. In the draft EIS' economic analysis, the interagency team used the Interim Bison Management Plan as the first alternative, or baseline condition, and the six other alternatives as potential future plans.

For each of its six alternatives, the interagency team quantified and assigned dollar values to the changes in benefits and costs from the baseline conditions. In terms of costs, the interagency team identified the direct costs to the government, such as the costs to construct and operate facilities to capture and quarantine bison and to acquire land for special management areas. The benefits measured include those from the recreational viewing of bison and from their "existence." Recreational viewing benefits are defined in the draft EIS as the value that visitors to Yellowstone National Park might place on increased or decreased opportunities to view bison. Existence benefits are defined as the value that U.S. citizens collectively might place on government actions to improve the habitat and sustain the population of bison. For example, as indicated in table 3, the interagency team estimated that implementing the preferred alternative between 1997 and 2011 would provide net benefits ranging from about -\$25 million (that is, negative \$25 million) to \$112 million. The second alternative in the draft EIS, which assumes a larger bison population and the acquisition of more land for winter range than the preferred alternative, would provide net benefits ranging from about -\$27 million to \$153 million over the 15-year life of the plan. The fifth alternative, which among other things would prevent the wild bison from moving beyond the park's boundaries, would provide net benefits of about -\$83 million over the life of the plan.

**Table 3: Projected Economic Effect of Alternatives in the Draft EIS, 1997-2011**

Dollars in 1997 millions

Alternative	Estimated costs	Estimated benefits		Estimated net benefits	
		Low	High	Low	High
1 <sup>a</sup>	\$0	\$0	\$0	\$0	\$0
2	29	2	182	-27	153
3	23	12	168	-11	145
4	0.7	0.1	0.1	-0.5	-0.5
5	2	-79	-81	-82	-83
6	3	3	-6	-5	-8
7 <sup>b</sup>	23	-2	135	-25	112

Note: Numbers may not add to totals because of rounding. Estimated costs, benefits, and net benefits are changes from the baseline, alternative 1, the Interim Bison Management Plan, and represent annual values discounted to 1997 dollars using the 7-percent real discount rate recommended by the Office of Management and Budget.

<sup>a</sup>Baseline.

<sup>b</sup>Preferred alternative.

Source: Draft EIS for the Interagency Bison Management Plan for the State of Montana and Yellowstone National Park, National Park Service (June 1998).

### Scope of Economic Analysis Conducted for Draft EIS Is Limited

Although the draft EIS states that a primary factor motivating the development of a bison management plan is the potential for widespread economic consequences to Montana if brucellosis is transmitted from bison to cattle, the draft EIS does not estimate the risk of such transmission or the economic consequences of an outbreak of the disease. Without this more comprehensive information, the public and, ultimately, interagency decisionmakers may have difficulty assessing whether the economic consequences of an outbreak justify the costs of undertaking a particular preventive management action.

According to the draft EIS, the risk of transmitting brucellosis from wild bison to cattle cannot be estimated because there are no available data. Park Service officials said that the scientific literature includes no documented instance of brucellosis transmission from bison to cattle in a wild, uncontrolled setting. However, if the risk were known or could be approximated, the expected value of the costs of any alternative could be estimated and incorporated into a benefit-cost analysis to assess whether the alternative was worth doing.

In a recent report on brucellosis in the Yellowstone National Park area, the National Research Council found that the risk that wild, free-ranging bison

would transmit brucellosis to cattle is small, but not zero.<sup>7</sup> In other words, according to the Council's study, there is a small chance that over time cattle would become infected with brucellosis if wild bison were allowed to range outside the park.

The economic consequences of such an event are also not identified in the draft EIS. Members of the interagency team told us that they did not estimate the economic consequences because the agencies agreed that all of the draft EIS' alternatives would prevent transmission between wild bison and cattle and, as a result, would preclude economic effects on the livestock industry. Nonetheless, in justifying the purpose of and need for action, the draft EIS states that Montana's cash receipts for sales of cattle and calves equaled some \$656 million in 1996. However, the economic consequence of an outbreak, if it were to occur, would depend on a number of factors, including whether APHIS, which regulates the interstate shipment of cattle, downgraded Montana's brucellosis-free certification. For example, in response to public comments on the draft EIS, an APHIS economist recently estimated that if an outbreak were to occur and APHIS downgraded Montana's certification from brucellosis free to class A, the state's cattle producers might incur additional testing costs ranging from about \$5 million to \$16 million per year (1997 dollars) over several years. Under its current policy, APHIS would downgrade a state's brucellosis-free certification if two or more cattle herds were found to be infected with brucellosis during any 2-year period. In general, breeding cattle shipped interstate from a brucellosis-free state are not required to be tested for the disease. However, under class A, breeding cattle being shipped must be tested for brucellosis. In addition to the testing costs, APHIS estimated that Montana's cattle producers might forgo income of about \$5 million to \$23 million per year over several years because prices would decrease if buyers reduced their demand for Montana's cattle. Out-of-state buyers might be less willing to buy Montana's cattle if, despite testing, they perceived a risk of disease. APHIS stated, however, that the impact on prices is difficult to assess and, as a result, the estimate of forgone income is subject to uncertainty.

Under certain conditions, APHIS may downgrade only the affected area within a state, such as a county. For example, the agency may divide a state into two brucellosis classification areas if the state has met certain requirements, including one for committing sufficient resources to enforce the different testing requirements in each area. APHIS stated that under

<sup>7</sup>Brucellosis in the Greater Yellowstone Area, National Research Council (Washington, D.C.: National Academy Press, 1998), 186 pp.

Lack of Original Data  
Substantially Limits Usefulness  
of Estimated Net Benefits

these conditions, the additional costs of testing for brucellosis and of forgone income would be much lower because fewer cattle producers would be affected. For example, APHIS estimated that if just two counties neighboring the park were downgraded to class A, the counties' livestock producers might, over several years, incur additional testing costs ranging from about \$169,000 to \$536,000 per year and forgo income ranging from about \$156,000 to \$741,000 per year.

According to the interagency team, because of court-imposed time constraints, its contractor was given only several weeks to assess the economic benefits associated with the alternatives presented in the draft EIS. These time constraints were part of a settlement agreement, approved by a federal district court, resolving a lawsuit that Montana brought against the Park Service and APHIS in 1995. Consequently, the contractor was unable to collect original data and relied instead on published studies of grizzly bears and wolves to approximate some of the benefits that would result from the various bison management plans.<sup>8</sup> According to the contractor, the economic data on grizzly bears and wolves represented the best available information for estimating the benefits of the bison herd's existence; that is, the amount of money individuals in the United States would be willing to pay to acquire land to improve the habitat and sustain the population of bison. The contractor chose the grizzly bear and wolf for comparison with the bison because, in an assessment of the preferences of visitors to Yellowstone National Park, visitors indicated that among these three species, they most often preferred viewing grizzly bears, then bison, and then wolves.

To approximate a "low-value" benefit for the existence of bison, the contractor used an estimate of the dollar amount that individuals would be willing to pay to ensure the existence of wolves. Similarly, to approximate a "high-value" estimate, the contractor used an estimate of the dollar amount people would be willing to pay to preserve grizzly bears. In applying the data for grizzly bears and wolves to bison, the contractor used professional judgment to calibrate the original estimates. In addition, to derive the total amount the U.S. population would be willing to pay to acquire habitat and sustain the bison population, the contractor multiplied the low- and high-value estimates for bison by the number of households, about 75 million, in the United States. Consequently, the contractor estimated that the amount of money the U.S. population would be willing to pay under the preferred alternative would range from about \$10 million

<sup>8</sup>"The Reintroduction of Gray Wolves to Yellowstone National Park and Central Idaho," Final EIS, U.S. Department of the Interior (1994) and "Grizzly Bear Recovery in the Bitterroot Ecosystem," Draft EIS, U.S. Department of the Interior (1997).



to about \$147 million. The second alternative, which would provide for acquiring a larger winter range area than the preferred alternative, is estimated to provide somewhat higher existence benefits, ranging from about \$16 million to about \$223 million. By adding in the other benefits and subtracting the estimated costs of implementing each alternative, the interagency team derived the benefit and cost estimates shown in table 3. For example, as indicated in table 3, the Interim Bison Management Plan (the baseline) would provide the greatest net benefits (\$0) under the low-value scenario, while the second alternative would provide the greatest net benefits (\$153 million) under the high-value scenario.

Typically, in conducting a benefit-cost analysis, an economist will provide information on the most likely (the mean) net benefit for each alternative, as well as information on how the estimate could change if actual events differed from key assumptions. This type of information can give final decisionmakers greater confidence as to which alternative is likely to provide the greatest net benefits to society. However, because of the imprecision associated with applying the data on grizzly bears and wolves to bison, the interagency team's contractor did not estimate the most likely values. Although the draft EIS acknowledges that these estimates are subject to considerable uncertainty, the range of uncertainty is so wide that it substantially limits the usefulness of the estimates. Without more precise information, the public and the interagency final decisionmakers may have difficulty assessing which alternative would likely provide the greatest net benefits.

The economic analysis presented in the draft EIS was not used to select the preferred alternative because the interagency decisionmakers selected the preferred alternative before the analysis was completed. However, the final decisionmakers will have access to the analysis presented in the final EIS. Members of the interagency team said they plan to improve the precision of the benefit estimates in the final EIS by using bison-specific data that are currently being collected. Improving the precision of these estimates will enhance the usefulness of the economic information for the final decision on how the Yellowstone bison will be managed in the future.

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## A "Modified" Preferred Alternative Is Currently Being Negotiated

Given the lack of public support for the preferred alternative and the additional research that was completed after the issuance of the draft EIS, the interagency team is considering modifying the preferred alternative for the final EIS. The team plans to publish the final EIS in late 2000 and

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afterwards issue records of decision on how the Yellowstone bison will be managed in the future.

From June 16 through November 3, 1998, the interagency team received public comments on the draft EIS by letter and electronic mail and at public meetings held in 13 cities across the United States. The team received a total of 67,520 public comment documents containing 212,249 individual comments. The interagency team employed a contractor to analyze the content of these comments and compile and correlate similar comments into a format usable by the decisionmakers and the interagency team. About 47,000 comments, or about 70 percent of those received by the interagency team, opposed the draft EIS' preferred alternative. The interagency team is currently determining how the final EIS will be changed in response to these comments.

In addition to public comments, research that has become available since the draft EIS was issued is being considered during the development of the final EIS. This research includes a 1998 National Research Council study that assessed the current state of knowledge about brucellosis infection and transmission, made recommendations for further research, and examined the implications of various management options. In addition, research by the University of Wyoming indicates that the brucellosis bacteria live in the environment for a much shorter period than originally thought at the time of year that cattle are moved back to public land used by bison in the winter and early spring. Finally, the results of field tests on a group of Yellowstone bison that were slaughtered this past winter showed that, of those whose blood tested positive for brucellosis, 86 percent tested negative in more extensive tissue culture analyses.

The interagency team also pointed out that some concerns about bison management have changed since the draft EIS was published. For example, two phases of an agreement to acquire portions of the Royal Teton Ranch, a 12,000-acre ranch adjacent to the north entrance of the park, have been completed. This agreement, among the Forest Service, the Rocky Mountain Elk Foundation, and the Church Universal and Triumphant, involves the exchange or purchase of land and easements. The Department of the Interior has also become a partner in the project by contributing Land and Water Conservation Funds for part of the acquisition. According to the interagency team, this land provides a critical wildlife migration corridor and winter range for many species, including bison.

In both May and July of 1999, the Park Service, APHIS, and the Forest Service presented proposals to the Governor of Montana for modifying the draft EIS' preferred alternative. In subsequent meetings, facilitated by the Department of Justice, the three participating federal agencies and the state have continued to negotiate the specific elements of a modified preferred alternative that will be acceptable to all of the parties and will address the concerns raised in public comments.

On November 5, 1999, the federal agencies outlined their most recent proposal to the state of Montana for a modified preferred alternative to be included in the final EIS. This latest proposal emphasizes the use of adaptive management in developing a long-term plan for bison management. Adaptive management is a strategy that recognizes the need for flexibility and allows for further modification of the bison management plan if the results of the initial approach and/or future research indicate a need for change. The federal agencies' latest proposal for a modified preferred alternative includes, among others, the following elements:

- Bison population limits. The modified plan would increase the overall limit on the bison population to 3,000 animals. This limit could be adjusted, depending on the results of ongoing studies of the park's carrying capacity, scheduled to be completed in 2002-03. The draft EIS' preferred alternative would have limited the bison population to 2,500 animals.
- Bison vaccination. The modified alternative would phase in a parkwide bison vaccination program. Initially, bison held in capture facilities would be vaccinated when a safe vaccine became available—a development expected by the winter of 2000-01. After a safe and effective mechanism was developed to deliver a vaccine remotely (from a distance), all bison moving out of the park in the West Yellowstone area would be vaccinated. Such a delivery mechanism is expected to be ready during the winter of 2002-03. The Park Service will not vaccinate bison inside the park until a safe and effective bison vaccine and a safe and effective remote delivery mechanism are available—now projected to be the winter of 2003-04. Montana will not allow untested bison outside Yellowstone National Park until the bison vaccination program has been initiated inside the park. The untested bison outside the park would be managed through the use of spatial and temporal risk management approaches designed to prevent the transmission of disease. Spatial (space) risk management involves keeping bison and cattle physically separate by not allowing them to occupy the same land at the same time. Temporal (time) risk management separates the use of the same land by bison and cattle by a period of time. The

modified alternative would accelerate the vaccination of bison. The draft EIS' preferred alternative would not have allowed them to be vaccinated until all studies of the vaccine's safety and effectiveness had been completed.

- Bison management in the areas near the northern and western boundaries of Yellowstone Park. The modified plan emphasizes a regime, to be implemented immediately upon the plan's adoption, that would manage risk with time and space. While the draft EIS' preferred alternative proposed to separate bison and cattle for variable periods of time only on the west side of the park, the modified plan would ensure their separation in time and space through the implementation of "adaptive management" steps. These steps are tailored to land uses on the north and west sides of the park that will change over time, as well as to the status of the bison vaccination program. The modified plan outlines steps to implement separation in space through the use of management zones. Specifically, public land outside the park would be divided into areas where bison would be subject to different actions intended to limit their movement and enforce boundaries. Separation in time would be maintained by hazing bison back into the park and off land that cattle would occupy on dates agreed to by the state and federal agencies. Any bison that could not be moved by hazing would be captured and tested. Bison testing positive for brucellosis would be sent to slaughter, and those testing negative would be sent to quarantine if a facility were available. Any bison that could not be hazed back into the park by the agreed date would be shot. Furthermore, under the most recent version of the modified plan, cattle could not occupy public grazing land until 45 days after bison had ceased to occupy it. This 45-day period of separation is based on APHIS' determination that the bacterium that causes brucellosis would be highly unlikely to survive in soil 45 days after the bison's departure.
- Bison capture facilities. The modified proposal provides for using the same three facilities to capture bison as the preferred alternative. However, the modified proposal adds a fourth facility, designed to prevent bison from leaving newly acquired lands in the north. These facilities would be used to capture bison when their numbers reached the agreed-upon limit and when it was necessary to enforce the 45-day period of separation between bison and cattle that the modified plan proposes for both the north and west sides of the park.
- Contingency plan for potential large movements of bison outside park boundaries. The goal of the contingency plan is to provide for a generally

stable bison population by reducing the number of bison killed outside the boundaries of Yellowstone National Park while still preserving Montana's brucellosis-free certification. The agencies would seek to reduce the number of bison that would be shot or shipped to slaughter in the event that extreme winter weather conditions, such as those that occurred during the winter of 1996-97, caused large movements of bison beyond the park boundaries. The agencies would implement many of the contingency measures at the onset of winter so that, if bison migrated from the park, the measures would be in place and would provide maximum flexibility in reducing the number of bison that the agencies needed to remove. Although the draft EIS' preferred alternative addressed the movement of bison outside the park, it did not establish a contingency plan for minimizing the number of bison killed.

- Cattle vaccination. Under the modified plan, Montana would encourage the voluntary vaccination of cattle that graze in areas outside the park where bison may range in the winter. If 100 percent of the cattle in these areas were not voluntarily vaccinated by the fall of 2000, Montana would make vaccinations mandatory, and the federal government would reimburse the state for the direct cost of the vaccination. The draft EIS' preferred alternative only encouraged the vaccination of cattle inhabiting areas in Montana near the park.
- Quarantine facility. The federal agencies would initiate a NEPA analysis to determine the location, design, and operation of a bison quarantine facility. APHIS would serve as the lead agency in the design of the facility and would oversee its operation. The facility would follow APHIS' quarantine protocol. Bison that passed through the quarantine protocol could be transferred to Indian reservations or other appropriate public lands. Bison that tested negative for brucellosis would be sent to a quarantine facility when (1) more than a fixed number of bison occupied the northern and western management areas (expected to be 100 in each), (2) the overall bison population was greater than 3,000 animals, or (3) bison were being captured and tested at the northern and western boundaries of the park to enforce the 45-day period of separation between bison and cattle using the same public lands in the northern and western areas of the park. The draft EIS' preferred alternative did not propose that APHIS would be the lead agency in the design of a quarantine facility or that APHIS would oversee its operations.
- Threats of state sanctions. If a state threatened to impose or imposed sanctions on Montana for actions taken to conform with the Interagency

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Bison Management Plan, APHIS would consult with the state to convince its officials that such sanctions were not necessary and were not supportable. If the state persisted and imposed sanctions or refused to withdraw previously imposed sanctions, APHIS would work with Montana to pursue all legal remedies against that state, including seeking an injunction against any such sanction. The draft EIS' preferred alternative did not address the threat of other states' imposing sanctions on Montana's cattle industry.

As of November 10, 1999, members of the interagency team from the state and federal agencies said that negotiations on the latest proposal for modifying the preferred alternative were ongoing. A new bison management plan will not be completed until the final EIS is published and the agencies issue records of decision.

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## Agency Comments and Our Evaluation

We provided copies of a draft of this report to the Department of Agriculture, the Department of the Interior, and the state of Montana for their review and comment. We received letters commenting on the report from the Department of Agriculture's Forest Service, the Department of the Interior, and the state of Montana. The Department of Agriculture's Animal and Plant Health Inspection Service indicated that it had no comments on the report.

Interior stated that the draft report accurately reflected the facts surrounding the bison management issue and the ongoing planning process. The Department also suggested technical clarifications to the draft report that we incorporated as appropriate. The Forest Service stated that the agency generally concurs and believes the report accurately and fairly represents the information collected on the environmental impact of the alternatives for managing bison. Montana commented that the draft report was thorough and objective but suggested that we either delete or update information on the proposed modification of the preferred alternative. We agree with the need to update information on the latest preferred alternative and included information in our final report on the modification proposed in November 1999. The agencies' and state's letters appear in full in appendixes II (for the Department of Agriculture's Forest Service), III (for the Department of the Interior) and IV (for the state of Montana).

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## Scope and Methodology

To identify the key elements of each of the proposed plans for managing the Yellowstone bison, we obtained and reviewed copies of the draft EIS, the Interim Plan on Bison Management, and the nongovernmental bison management plans. We also interviewed National Park Service and Department of the Interior officials in Washington, D.C. and in Yellowstone National Park; Forest Service officials in Washington, D.C., and Gallatin National Forest; APHIS officials in Washington, D.C., and the Bozeman field office; and officials from the Montana Department of Livestock. We identified and interviewed the authors of and substantive experts on the five nongovernmental plans to learn about the development and objectives of the plans and the management actions needed to implement them.

To identify the strengths and weaknesses of the economic analysis used to support each plan, we used standard microeconomic principles and the Water Resources Council's guidance for conducting economic analysis. We interviewed the authors of the alternative plans about the economic analyses presented in their plans. For the interagency plan, we also interviewed the Park Service's economic consultant to identify the analytical framework and the data and assumptions used for the economic analysis presented in the draft EIS.

To determine the current status of efforts to issue the final EIS, we obtained a copy of and analyzed the proposal to revise the draft EIS' preferred alternative. We also interviewed headquarters officials at the Department of the Interior, the National Park Service, and APHIS.

We conducted our review from March through November 1999 in accordance with generally accepted government auditing standards.

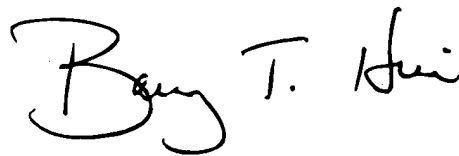
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We are sending copies of this report to members of the Greater Yellowstone area's congressional delegation: Senator Max Baucus of Montana, Senator Conrad Burns of Montana, Senator Larry Craig of Idaho, Senator Mike Crapo of Idaho, Senator Craig Thomas of Wyoming, Senator Mike Enzi of Wyoming, Representative Rick Hill of Montana, Representative Helen Chenoweth of Idaho, Representative Michael K. Simpson of Idaho and Representative Barbara Cubin of Wyoming. We are also sending copies of this report to the Honorable Bruce Babbitt, Secretary of the Interior; the Honorable Robert Stanton, Director, National Park Service; the Honorable Dan Glickman, Secretary of Agriculture; the Honorable Mike Dombeck, Chief, Forest Service; the Honorable Craig

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Reed, Administrator, Animal and Plant Health Inspection Service; the Honorable Jacob Lew, Director, Office of Management and Budget; the Honorable Marc Racicot, Governor of Montana; the sponsors of the nongovernmental bison management plans; and other interested parties. We will also make copies available to others upon request.

If you have any questions or need additional information, please contact me at (202) 512-3841. Key contributors to this report include Timothy J. Guinane, John P. Scott, and Jim Yeager.

A handwritten signature in black ink that reads "Barry T. Hill". The signature is written in a cursive style, with the first name "Barry" being more prominent and the last name "Hill" following it.

Barry T. Hill  
Associate Director, Energy,  
Resources, and Science Issues



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## Abbreviations

APHIS	Animal and Plant Health Inspection Service
EIS	environmental impact statement
NEPA	National Environmental Policy Act of 1969
NRC	National Research Council

# Comparison of the Key Elements of the Proposed Bison Management Plans

Key element	1998 draft EIS' alternative 7, the preferred alternative	Bison Alternative	Plan B
Sponsor(s)	Environmental impact statement (EIS) co-lead agencies: the Department of the Interior's National Park Service, the Department of Agriculture's Forest Service, and the state of Montana. The Department of Agriculture's Animal and Plant Health Inspection Service is a cooperating agency.	The Fund for Animals; other organizations, including the Humane Society and the Earth Island Institute; and over 1,600 individuals.	Written and submitted by an independent wildlife biologist. Endorsed by environmental, political, taxpayer, and Native American organizations, such as the Montana Ecosystems Defense Council, the Ecology Center, and Taxpayers for Common Sense.
Purpose	<ul style="list-style-type: none"> <li>— Maintain a wild, free-ranging population of bison.</li> <li>— Address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in Montana.</li> </ul>	<ul style="list-style-type: none"> <li>— Maintain a wild, free-ranging population of bison.</li> <li>— Address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in Montana.</li> </ul>	<ul style="list-style-type: none"> <li>— Maintain a wild, free-ranging population of bison.</li> <li>— Ensure that the Yellowstone bison do not affect Montana's brucellosis-free certification.</li> <li>— Protect the state against sanctions imposed by other states.</li> </ul>
Objectives	<ul style="list-style-type: none"> <li>— Address bison population size and distribution; have specific commitments relating to the size of the bison herd.</li> <li>— Clearly define a boundary beyond which bison will not be tolerated.</li> <li>— Address the risk to public safety and the threat of damage to private property posed by bison.</li> <li>— Commit to the eventual elimination of brucellosis in bison and other wildlife.</li> <li>— Protect livestock from the risk of brucellosis transmission.</li> <li>— Protect Montana from the risk of a reduction in its brucellosis-free certification.</li> <li>— At a minimum, maintain a viable population of wild bison in Yellowstone National Park, as defined in biological, genetic, and ecological terms.</li> <li>— Base each alternative on factual information, with the recognition that the scientific database is changing.</li> <li>— Recognize the need for coordination in managing the natural and cultural resource values that are the responsibility of the signatory agencies.</li> </ul>	<ul style="list-style-type: none"> <li>— Provide for a naturally regulated, protected bison population.</li> <li>— Restore Yellowstone as a bison sanctuary.</li> <li>— Manage the risk of brucellosis transmission by emphasizing the active management of cattle.</li> <li>— Manage bison like wildlife, not like cattle.</li> <li>— Protect Montana from sanctions by other states or the Department of Agriculture.</li> </ul>	<ul style="list-style-type: none"> <li>— Ensure that the Yellowstone bison do not affect Montana's brucellosis-free certification.</li> <li>— Protect Montana from sanctions by other states.</li> <li>Avoid the economic consequences associated with brucellosis.</li> <li>— Manage risk in a cost-effective and reasonable way.</li> <li>— Provide for wild, free-roaming populations of bison, maintained at levels consistent with the ecological carrying capacity of the Greater Yellowstone area and of Montana, wherever natural habitat exists for them.</li> </ul>

**Appendix I  
Comparison of the Key Elements of the  
Proposed Bison Management Plans**

<b>Alternative 8</b>	<b>Citizens' Plan</b>	<b>USAHA Plan</b>
Fort Belknap Indian Community of Montana.	Greater Yellowstone Coalition, Defenders of Wildlife, Intertribal Bison Cooperative, National Parks and Conservation Association, National Wildlife Federation, and other organizations.	U.S. Animal Health Association.
<ul style="list-style-type: none"> <li>— Maintain a wild, free-ranging population of bison.</li> <li>— Address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in Montana.</li> </ul>	<ul style="list-style-type: none"> <li>— Maintain a wild, free-ranging population of bison.</li> <li>— Address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in Montana.</li> </ul>	<ul style="list-style-type: none"> <li>— Maintain a wild, free-ranging population of bison.</li> <li>— Address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in Montana.</li> </ul>
<ul style="list-style-type: none"> <li>— Protect and preserve the bison as a free-ranging species of wildlife.</li> <li>— Reaffirm the trust relationship between the buffalo and the Indian nations (tribes).</li> </ul>	<ul style="list-style-type: none"> <li>— Protect the largest free-ranging bison herd in the United States.</li> <li>— Establish measures to protect private property and livestock interests.</li> <li>— Manage Yellowstone as a "natural" park.</li> <li>— Allow adequate habitat for wildlife while protecting livestock from disease through separation.</li> <li>— Manage bison to the ecological carrying capacity of the park and special management areas.</li> <li>— Give bison priority on public lands.</li> </ul>	<ul style="list-style-type: none"> <li>— Meet the objectives set for the government's preferred alternative with an emphasis on eradicating brucellosis from bison and keeping exposed bison inside the park's boundaries.</li> </ul>

(continued)

**Appendix I  
Comparison of the Key Elements of the  
Proposed Bison Management Plans**

<b>Key element</b>	<b>1998 draft EIS' alternative 7, the preferred alternative</b>	<b>Bison Alternative</b>	<b>Plan B</b>
Summary of plan's overall management approach	Manage for a population of 1,700 to 2,500 bison. Maintain the separation of bison and cattle. Use a mixture of management tools to meet the plan's objectives, including monitoring and hazing; capture, testing, slaughter or quarantine; vaccination of bison; acquisition of land or easements from willing sellers north of the park; hunting, and agency shooting of bison. Encourage but not require the vaccination of cattle. Possibly change cattle grazing allotments north of the park.	Allow bison to roam freely and be regulated naturally. Modify winter use management to restore natural regulation as the primary mechanism for controlling population. Alter cattle operations on private and public lands and require the vaccination of cattle to reduce the risk of bacterial transmission.	Adopt a cost-effective approach to disease management by addressing the underlying factors that cause brucellosis to be problematic. Reduce the prevalence of brucellosis in bison by nonintrusive, remote vaccination. Vaccinate and annually test the few cattle in areas used by bison, remove cattle from public lands used by bison, and compensate ranchers who switch to no-risk operations. Maintain bison populations at ecological carrying capacities through active management.
Use of special management areas	Yes, on the north and west sides of the park in Montana	No.	No.
Areas where bison are free to range	Within the park or special management areas.	Anywhere.	Anywhere except on private property.
Bison population size	Manage herd within range of 1,700 to 2,500 animals	No set limit, naturally regulated.	Calculate the ecological carrying capacity for bison in the Greater Yellowstone area (outside the park) and manage bison to maintain these numbers.
Hunting	On all public lands in special management areas if the Montana legislature approves.	No, prohibited.	Hunting is one of the tools that could be used to limit the size of the bison herd to the ecological carrying capacity of land outside the park.
Winter road grooming	Continue grooming roads for snowmobiles.	End grooming and snowmobile use.	Not addressed; considered a separate issue.
Hazing	May be used to ensure that bison stay in special management areas or move into the park 30 to 60 days before cattle occupy an area.	Use is generally opposed but may be acceptable if done humanely at an appropriate time to move bison from areas where they are unwelcome.	May be used to keep bison not classified as "low-risk" away from cattle when owners have not changed to steer-only operations.
Facilities to capture bison	Three located as follows: (1) in the park at Stephens Creek (phase I) or north of park between Reese Creek and Yankee Jim Canyon (phase II) and west of the park (2) at Duck Creek on private land and (3) at Horse Butte on public land.	None.	None.

**Appendix I**  
**Comparison of the Key Elements of the**  
**Proposed Bison Management Plans**

<b>Alternative 8</b>	<b>Citizens' Plan</b>	<b>USAHA Plan</b>
Allow bison to range freely and retain their status as wildlife. Give bison priority over livestock in the use of all public lands outside the park. Make the acquisition of land for winter range and migration routes a priority. Assign the highest priority to live removals of bison through capture, testing, and quarantine.	Manage herd size to the ecological carrying capacity of land both inside the park and within special management areas. Minimize disease transmission through separation, including changes in cattle operations on public lands and the acquisition of land or easements. Regulate herd sizes through public harvest or live removal to quarantine for later disposition to tribal or other public lands.	Aim to totally eradicate brucellosis from the Yellowstone bison. Under phase I, reduce the number of bison testing positive through vaccination. Under phase II, capture and test every bison within the park, slaughter those testing positive, and quarantine those testing negative.
Yes, allow bison to use public lands outside the park within broadly defined special management areas.	Yes, north and west of the park in Montana, but keep boundaries flexible, especially on west side public land.	No, on the west side. Limit the special management area on the north side to the Little Trail Creek/Eagle Creek area.
Within the park and broad special management areas.	Within the park. Manage excess numbers in the special management area, within flexible boundaries.	Bison are confined and managed in the park or in a small special management area on north side
Establish population goals for the herd on the basis of science, not politics, for available habitat within and outside the park.	Establish ecological carrying capacities for the park and special management areas outside the park.	Limit the herd to a maximum of 1,800 bison inside the park until an evaluation of the range's carrying capacity is done.
None.	Yes, in special management areas, when the size of the herd reaches its upper limit.	Yes, in the Little Trail Creek/Eagle Creek special management area if Montana approves hunting.
Not addressed.	Continue grooming roads for snowmobiles, but study their impact and take action in the future if warranted.	Plow more roads for access to bison capture facilities.
May be used to move bison from areas where they are not permitted.	May be used if the population in an area is too high or bison are on private land where there is potential for them to harm persons or property.	The Park Service is responsible for hazing bison back from the park's boundaries.
Within 18 months, construct facilities in appropriate locations to capture bison.	Relocate outside the park to regulate excess populations—one facility in each special management area on the north and west sides of the park.	Nine facilities as follows: Stephens Creek on the north and a new facility inside the park on the west (phase I) and seven facilities throughout the park as described in alternative 6 (phase II).

(continued)

**Appendix I  
Comparison of the Key Elements of the  
Proposed Bison Management Plans**

<b>Key element</b>	<b>1998 draft EIS' alternative 7, the preferred alternative</b>	<b>Bison Alternative</b>	<b>Plan B</b>
Bison testing negative for brucellosis	North side: Send to slaughter or quarantine if available. If population is low, hold animals testing negative until spring. West side: Ship all to quarantine if population is high or just those that are pregnant if population is lower; release nonpregnant bison that test negative to public lands, using metal ear tags and temporary visual markers to indicate their status.	No testing or action.	No action.
Bison testing positive for brucellosis	Ship to slaughter.	No testing or action.	No action.
Monitoring of bison	Aerial and ground monitoring within and adjacent to the park.	Continue agencies' existing monitoring of bison within and adjacent to the park.	Done by the Montana Department of Fish, Wildlife and Parks for bison as for other species.
Quarantine operations	Quarantine (1) all bison testing negative from the north capture facility and (2) either all those testing negative or only those pregnant females testing negative from the west capture facility, depending on the population.	None.	None.
Distribution of excess live bison	After going through an APHIS-approved quarantine protocol, bison could be (1) made available to establish populations on tribal lands or other appropriate public lands or (2) provided to public institutions or qualified recipients.	No animals should be removed from the ecosystem.	No distribution.
Control of bison on private lands	Try hazing first; then hunt bison with the landowner's permission and remove at the landowner's request. Per state law, the landowner can also remove bison.	Avoid hazing unless it can be done humanely at an appropriate time to move bison from private lands where they are unwelcome.	Use volunteers to haze bison from private land upon request.
Land or easement acquisition	Under phase II, acquire additional winter range north of Reese Creek.	Acquire private grazing lands, if available, as additional winter range.	None.
Changes in private cattle operations	Make no changes.	Mandate measures to reduce risk: use public funds to modify the type of cattle operation, construct fencing, and require vaccination and testing.	Vaccinate all cattle and annually test herds where contact with bison is possible.
Changes in public cattle allotments	Possibly change national forest grazing allotments north of the park in phase II. Make no changes on the west side in either phase I or phase II.	Prohibit cattle grazing on affected public lands. The Forest Service could provide alternative public lands.	Give bison preference over cattle on public lands; remove cattle if there are conflicts; limit grazing permits to steer-only or other low-risk operations.

**Appendix I  
Comparison of the Key Elements of the  
Proposed Bison Management Plans**

<b>Alternative 8</b>	<b>Citizens' Plan</b>	<b>USAHA Plan</b>
Place in a quarantine facility for eventual relocation to tribal lands in coordination with the Intertribal Bison Cooperative.	Quarantine excess bison testing negative for live removal to tribal or other public lands.	Return to the park or place in a quarantine facility.
Confine to a holding facility and notify tribal governments to use the animals to meet their needs. Where possible, use for research on brucellosis.	Not addressed; however, a positive test would not result in removal unless the population was high.	Ship to slaughter or destroy and place carrion for use by grizzly bears.
Not addressed.	Expected to occur for use by the proposed advisory group.	Aerial and ground monitoring within and adjacent to the park.
Quarantine animals that test negative and are eligible for live removal.	Operate a facility away from the park and special management areas to reduce its environmental impact; modify the quarantine protocol to make it more efficient and humane.	Operate a facility within or adjacent to the park as soon as possible rather than destroy bison that test negative.
Work with tribal governments and the Intertribal Bison Cooperative to implement a "live removal" relocation option under the EIS' quarantine protocol.	Transfer excess disease-free bison to Native American tribes to repopulate tribal lands or transfer such bison to other public lands where they would be accepted.	Make bison available for release outside the area if they have successfully completed an APHIS-approved quarantine protocol.
Haze bison from private land where they are not permitted.	Haze bison from private land to avoid conflicts with human safety or property.	Try to keep bison off private lands. If they do get out of the park and are unresponsive to hazing, shoot them at the landowner's request.
Make the acquisition of additional land from willing sellers for winter range and migration routes a priority.	Acquire key winter range north and west of the park by purchasing land or easements from willing sellers.	Make no change in existing land use or ownership.
Offer incentives to modify livestock operations on federal, state, or private land so as to help maintain a wild, free-ranging bison herd.	Provide incentives to modify the type, timing and location of cattle operations.	Make no change, but encourage vaccination and require surveillance testing of cattle in high-risk areas.
In the use of public land, give bison precedence over livestock that may remain on the land under modified permits that reduce or eliminate contact between bison and livestock.	Change the type, timing, and location of cattle operations to accommodate bison on public lands.	Do not modify national forest grazing allotments.

(continued)



**Appendix I  
Comparison of the Key Elements of the  
Proposed Bison Management Plans**

<b>Key element</b>	<b>1998 draft EIS' alternative 7, the preferred alternative</b>	<b>Bison Alternative</b>	<b>Plan B</b>
Surveillance testing of cattle	Recommend testing of whole herds within special management areas if bison and cattle intermingle.	Federal and state agencies will use testing in conjunction with fencing for separation and vaccination.	Not addressed.
Cattle vaccination	Encourage vaccination of all female calves within a 20-mile radius of the park or special management area.	Require vaccination of cattle.	Require vaccination of cattle where contact with bison is possible.
Bison vaccination	Vaccinate bison at capture facilities when a safe and effective vaccine is available; vaccinate free-ranging bison remotely when an effective delivery system is also available.	None.	Vaccinate bison when a safe and effective vaccine is available
Reduction in the number of bison testing positive for brucellosis	Negligible to minor decrease in the number of bison testing positive compared with the results expected from the no action alternative.	Not addressed.	Not estimated.
Sponsor's view of risk to viability of state livestock industry	Risk would be eliminated.	Not addressed, but sponsors believe virtually all risk of brucellosis transmission would be eliminated.	Risk would be managed and reduced.
Extent of handling, manipulation of bison	High—capture, test, transfer to slaughter or quarantine facility; vaccination; hunting.	None.	Low—vaccination and some hazing.
Use of management activities inside the park	Yes, the phase I capture facility on the north side is in the Stephens Creek area. Some hazing of bison is allowed inside the park.	No, activities are directed at cattle outside the park.	No, with the possible exception of vaccination when feasible.
Management changes	None.	None.	None.
Sponsor's view of genetic integrity	Limited data suggest that genetic viability and diversity would not be limited if a population of more than 1,700 bison were maintained.	Not addressed, but eliminating nearly all human-caused mortality would preserve the diversity of bison.	Not addressed.
Cost to federal government	\$1.8 million to \$2.1 million, plus shared costs, estimated at \$29.1 million to acquire land; costs to acquire easements and convert livestock operations not estimated.	Not estimated, but sponsor suggests that this natural regulation approach would be less expensive than other approaches.	Not estimated.
Cost to state	\$403,200 plus shared costs.	Not estimated, but sponsor claims that Montana's management cost would be reduced.	Not estimated.

**Appendix I  
Comparison of the Key Elements of the  
Proposed Bison Management Plans**

<b>Alternative 8</b>	<b>Citizens' Plan</b>	<b>USAHA Plan</b>
Not addressed.	Not addressed.	Require testing of cattle in areas in near West Yellowstone.
Vaccinate cattle at no expense to the livestock producer.	Require vaccination within and adjacent to the special management areas.	Encourage vaccination of female calves that may come in contact with bison.
None.	Allow vaccination of bison in the special management areas when a safe and effective vaccine is available and can be administered with assurance that elk will not reinfect bison.	Immediately implement a calf and yearling vaccination program; vaccinate adult bison with a reduced dose.
Not estimated.	Not estimated.	Under phase I, the number of bison testing positive should be reduced; under phase II, all bison testing positive would be eliminated.
Not estimated.	Not estimated	Risk would be eliminated under this plan.
Medium—capture, test, and transfer bison testing negative to quarantine. Hold those testing positive and use for tribal needs. No vaccination.	Medium—if the population level is high, test bison and transfer those testing negative to quarantine. Also harvest excess bison in special management areas. No test and slaughter for disease control.	Very high—vaccinate, haze, capture, test, and slaughter or quarantine, mostly within the park.
No, activities are to be located in special management areas.	No, capture, testing, and other activities are done only within the special management areas and are not visible to the public.	Yes, capture, testing and quarantine facilities are located, and bison are vaccinated, in the park, and park roads are plowed for winter access.
Yes, meaningful consultation with tribal governments and the Intertribal Bison Cooperative. They determine the distribution of live and harvested bison.	Establish an interagency, tribal, public advisory team as a communications tool to review conditions; continue cooperation; and make plans for bison management.	None.
Not addressed.	Would establish minimum numbers to maintain a wild, genetically diverse bison herd.	Would not be an issue unless the population fell below 600 head. The population limit is set much higher.
Not estimated.	Not estimated.	Not estimated .
Not estimated.	Not estimated.	Not estimated.

(continued)

**Appendix I**  
**Comparison of the Key Elements of the**  
**Proposed Bison Management Plans**

<b>Key element</b>	<b>1998 draft EIS' alternative 7, the preferred alternative</b>	<b>Bison Alternative</b>	<b>Plan B</b>
Cost to private sector	No costs to livestock operators for cattle vaccination or testing above the costs of the no action alternative.	Not estimated, but the private sector would be compensated for the costs of mandated changes.	Not estimated.
Net benefits estimated	The net present value range is estimated to be -\$24.9 million to +\$112 million over 15 years, depending on the assumptions.	Not estimated because the plan is not intended to meet the requirements of the National Environmental Policy Act of 1969 (NEPA).	Not estimated.

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**Appendix I**  
**Comparison of the Key Elements of the**  
**Proposed Bison Management Plans**

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<b>Alternative 8</b>	<b>Citizens' Plan</b>	<b>USAHA Plan</b>
Not estimated.	Not estimated, but includes a voluntary program to compensate private property owners for damage caused by the natural movement of bison.	Not estimated.
Not estimated.	Not estimated.	Not estimated.

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Source: Interviews of and documents provided by the authors and/or sponsors of the respective plans.

# Comments From the Department of Agriculture's Forest Service



United States  
Department of  
Agriculture

Forest  
Service

Washington  
Office

14<sup>th</sup> & Independence SW  
P.O. Box 96090  
Washington, DC 20090-6090

File Code: 1420

Date: NOV - 5 1999

Barry T. Hill, Associate Director  
Resource, Community, and Economic Development Division  
General Accounting Office  
441 G. Street N. W.  
Washington, D. C. 20548

Dear Mr. Hill :

Thank you for the opportunity to review and comment on the General Accounting Office's draft report to Congressional requesters "*Wildlife Management: Negotiations on a Long Term Plan for Managing Yellowstone Bison Still Ongoing* (GAO/RCED-00-7)(GAO assignment code 141310).

The Forest Service generally concurs and believes the report accurately and fairly represents the information collected on the environmental impact of seven alternatives, including a preferred alternative for managing the bison.

If you have additional questions, please contact our External Audit Liaison, Linda Washington on (202) 205-3761.

VINCETTE L. GOERL  
Chief Financial Officer  
Deputy Chief, Office of Finance



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# Comments From the Department of the Interior



## United States Department of the Interior

OFFICE OF THE SECRETARY  
Washington, D.C. 20240

NOV 10 1998



Barry T. Hill  
Associate Director, Energy, Resources  
and Science Issues  
U.S. General Accounting Office  
Washington, D.C. 20548

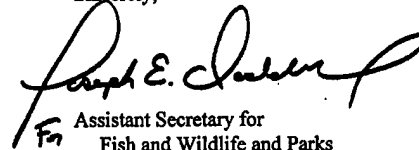
Dear Mr. Hill:

The Department of the Interior has reviewed the draft General Accounting Office's (GAO) draft report entitled "WILDLIFE MANAGEMENT: Negotiations on a Long Term Plan for Managing Yellowstone Bison Still Ongoing" (GAO/RCED-00-7) (GAO code 141310).

Overall we found the draft report to be concise and well written. The report also accurately reflected the facts surrounding the bison management issue and the ongoing planning process. Mr. Jim Yeager and Mr. John Scott of your staff have done an admirable job. The enclosed comments contain a few factual clarifications and some suggestions for editorial corrections.

Thank you for the opportunity to review and comment on this draft report.

Sincerely,

  
Joseph E. Anderson  
Assistant Secretary for  
Fish and Wildlife and Parks

Enclosure

Appendix III  
Comments From the Department of the  
Interior

Enclosure

**Comments on GAO Draft Report, WILDLIFE MANAGEMENT, Negotiations on a  
Long-Term Plan for Managing Yellowstone Bison Still Ongoing, November 1999**

We have only three substantive comments regarding the factual content of the report. First, on page 5 of the draft report the sentence, "Blood tests indicate that about half of the bison herd in Yellowstone has brucellosis." is inaccurate. Standard field blood tests are only a measure of an antibody response to an animal's exposure to a pathogen, meaning the animal has been exposed at some time in their life to a pathogen and now has the antibodies. These tests do not measure whether an animal is infected (meaning bacteria is present in the body) or infectious (meaning having the ability to transmit the pathogen into the environment). Recent peer-reviewed published research has shown that standard brucellosis blood tests are inaccurate at determining infection. We suggest rewording the sentence to read, "Blood tests indicate that about half of the bison herd in Yellowstone have been exposed to brucellosis; however, recent research suggests substantially fewer are actually infected with the bacteria." We can provide you with a copy of the paper Roffe et al. 1999 at your request. Additionally, recent, more reliable tissue culture tests suggest that substantially fewer and, in some cases as many as 80% of those bison which initially tested positive, were actually not infected with the bacteria.

On page 6, paragraph 1, the report describes brucellosis and its effects on animals and humans. The last sentence reads, "Today, there are very few cases of undulant fever in the United States." In fact, according to the Center for Disease Control, in the past 10 years there have only been 3 reported cases in the state of Montana. We think it important to add an additional phrase to the sentence that reads, "and none of the undulant fever cases have been attributed to wild bison in the Greater Yellowstone Area. Most undulant fever has been attributed to people working with livestock."

The first full paragraph on page 26 also contains a factual error. The land purchase and exchange north of the Park boundary was between the USDA Forest Service and Royal Teton Ranch. The second sentence should read, "For example, two phases of a land exchange, purchase, and easement agreement between the USDA Forest Service and Royal Teton Ranch, a 12,000-acre ranch adjacent to the north entrance of the park, have been completed."

Finally, we list some minor editorial suggestions below. Suggested additions are in bold and deletions are in strikeout.

Page 1, first paragraph, fifth sentence, "If two of Montana's cattle..."

Page 12, sixth bullet, "Protect the Montana from the risk..."

Page 14, second full sentence at top of page, "Hunting would be keep at low levels..."

# Comments From the State of Montana

OFFICE OF THE GOVERNOR  
STATE OF MONTANA

MARC RACICOT  
GOVERNOR



STATE CAPITOL  
HELENA, MONTANA 59620-0801

November 9, 1999

Barry T. Hill  
Associate Director, Energy, Resources and Science Issues  
United States General Accounting Office  
Washington DC 20548

Re: WILDLIFE MANAGEMENT: Negotiations on a Long Term Plan for Managing  
Yellowstone Bison Still Ongoing (GAO/RCED-00-7) (GAO code 141310)

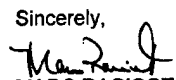
Dear Mr. Hill:

Thank you for requesting our review and comment on the draft report, prior to submitting the final report to your congressional requesters.

We appreciate the professionalism of Mr. Yeager, Mr. Scott and Mr. Guinane, the staff assigned to work on this project. They were courteous with the representatives from the State of Montana. Their investigation was thorough and objective and the quality of their work is reflected in the draft report.

We offer one substantive comment. The draft report references on-going negotiations to develop a revised preferred alternative on pages 26 and pages 27. The information presented is correct. However, we question whether the report should include the specifics details of the July 7, 1999, memorandum. The memorandum presented one of several proposals, suggested since the close of public comment on the DEIS, for the purpose of furthering the dialogue toward the eventual development of a revised preferred alternative that is acceptable to all of the cooperating agencies. We do not believe it is correct to reference only one of those proposals because, as yet, the issue remains unresolved. Therefore, we request that you delete that portion of the report or if you choose to retain that portion of the report, we request that you also include information about our response to the federal agencies' proposal.

Thank you for considering this suggestion.

Sincerely,  
  
MARC RACICOT  
Governor

TELEPHONE: (406) 444-3111 FAX: (406) 444-5529



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